

## Ammonium Sulfate Due for Competition from Synthetic Nitrogen

WHITE SULPHUR SPRINGS, W. VA.—The future role of ammonium sulfate in fertilizer manufacture depends on the possible effects of some of the newer trends in the field, Russell Coleman of the National Fertilizer Association told the American Coke and Coal Chemicals Institute meeting here on Oct. 13. Many manufacturers consider ammonium sulfate one of the most costly sources of nitrogen, he pointed out.

The growth of synthetic nitrogen may increase competition for coke oven ammonium sulfate, he warned.

The nitrophosphate process, now in use in this country, has been in use for some time in Europe. The several modifications of the process, based on the acidulation of rock phosphate with nitric acid, produce homogenous, high analysis, granular mixtures by a continuous operation. One of the modifications involves the use of sulfates, but this does not look as promising as those using sulfuric and phosphoric acids.

Widespread interest is being shown in the development of processes based on the utilization of greater amounts of ammonium nitrate in the manufacture of granulated high analysis mixtures. In some of these processes, all the nitrogen comes from ammonia and ammonium nitrate, said Dr. Coleman. The products must be granulated to aid in the maintenance of proper physical condition.

The manufacture of ammonium sulfate in the product during mixed fertilizer production may reduce the demand for

coke-oven sulfate. In cases where granulation is being carried out, some fertilizer manufacturers, during the course of their mixing operations, react sulfuric acid and anhydrous ammonia to form ammonium sulfate directly in their product.

"The general trend toward the use of higher ammoniation rates in the manufacture of mixtures" may have an effect on sulfate usage. The quantity of free ammonia which may be reacted with superphosphates is limited by the formation of unavailable forms of phosphate in the mixture. Since the practical use of higher amounts of free ammonia necessitates proper equipment for ammonia addition, and such additional machinery as coolers, it is highly doubtful that the majority of producers are presently employing the maximum amounts permissible. With improvements in manufacturing equipment and processing techniques, the trend toward greater use of anhydrous ammonia should find greater application, he feels.

A large increase is expected in ammonium phosphate production as a result of the present fertilizer expansion program. "Ammonium phosphates provide the manufacturer with a product combining good physical and chemical characteristics with high analysis."

There are some factors which will possibly counterbalance to some degree the decrease in usage of ammonium sulfate which the above developments would encourage. The simple increase in production to meet the considerably higher annual demand should mean the use of greater quantities of sulfate in fertilizers, declared Dr. Coleman. "The trend toward the manufacture of mixed fertilizers of higher analysis should likewise make for use of larger amounts of ammonium sulfate."

The acid-forming characteristics of ammonium sulfate, although advantageous for certain crops, have disadvantages for other crops. Sulfur content, low hygroscopicity, and other physical characteristics are important. However, mixed fertilizers satisfactorily using competitive nitrogen carriers are being developed. Coke-oven producers must continually improve their product, in order not to fall behind. Coating with clay or producing larger crystals might improve the physical condition of sulfate. Perhaps marketing on a per ton basis could be scrapped for a per unit basis if competition becomes quite keen. More storage facilities should be provided, since "farmers have reverted

to their pre-war buying practice of purchasing fertilizer only when needed."

**Plant Food.** Fertilizer nitrogen use has gone up from 398,000 tons in 1939 to 1.8 million tons in 1952-53, reported H. H. Tucker, of the Coke Oven Ammonia Research Bureau. Agronomically sound 1-1-1 ratio grades supply all of the needed plant nutrients, and have proven to be an outlet for much coke-oven ammonium sulfate. "In fact," said Dr. Tucker, "the higher nitrogen grades require ammonium sulfate to give good physical condition to the conventionally produced mix."

Coke-oven nitrogen production has not increased as fast as over-all nitrogen use. "Whereas coke ovens supplied better than 40% of the nitrogen used in all fertilizers in the United States in 1939, they now supply less than 15%." The fact that Middle Atlantic States coke ovens produced more nitrogen than was used in all mixed fertilizers in that area last year shows that they are still important, particularly in the areas of production.

Besides being locally produced and containing sulfur, a needed plant nutrient, ammonium sulfate has a fairly constant solubility with temperature changes, and is relatively nonhygroscopic. Admittedly, the nitrogen content is lower than some of the other nitrogen materials, and it is the most acid of all the nitrogen fertilizers per unit of nitrogen. Slight increases in the lime application easily overcomes this acidity, declared Dr. Tucker.

### Celebration Planned for Centennial of Entomology

Extensive plans are now under way for celebrating the centennial of professional entomology next June (AG AND FOOD Newsletter, Sept. 16). Purpose of the celebration plans is to give the general public information about the insect problem and contributions the profession has made to the national economy and the health and welfare of the individual during the 100 years of its existence.

Among the plans now being put into shape are: a commemorative banquet in Washington on June 14, 1954; a commemorative postage stamp; radio, TV, newspaper, and magazine coverage; open house at industrial, government, and university laboratories.

Cooperation from government, industry, and allied professions is being sought to make the plans more effective.

Letters will go to the Secretaries of Interior, Agriculture, and Health, Education and Welfare, to other federal and state agencies, and to the presidents and boards of directors of the national professional societies and trade associations

#### On The Cover

#### Better Packaging Films

Transparent plastic films are one striking example of research which has contributed to the recent revolution in food merchandizing, the development of the supermarket. The increase in the number and variety of prepackaged products available on the shelves of the American grocery store has been the result of cooperative research. Food technologists, chemists, engineers, and food processors have all contributed to the development of new packaging materials which the consumer has almost come to take for granted.

Meanwhile, research on new and still better packaging materials is pursued from laboratory to supermarket.

Photo Courtesy Du Pont Co.